

RAMAN INVESTIGATION OF TEMPERATURE PROFILES OF PHOSPHOLIPID DISPERSIONS IN THE BIO-CHEMISTRY LABORATORY

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The temperature dependence of self-assembled, cell-like dispersions of phospholipids is investigated with Raman spectroscopy in the biochemistry laboratory. Vibrational modes in the hydrocarbon interiors of phospholipid bilayers are strongly Raman active, whereas the vibrations of the polar head groups and the water matrix have little Raman activity. From Raman spectra increases in fluidity of the hydrocarbon chains can be monitored with intensity changes as a function of temperature in the CH-stretching region. The experiment uses detection of scattered 1064-nm laser light (Nicolet NXR module) by a Fourier transform infrared spectrometer (Nicolet 6700). A thermoelectric heater-cooler device (Melcor) gives convenient temperature control from 5 to 95°C for samples in melting point capillaries. Use of deuterium oxide instead of water as the matrix avoids some absorption of the exciting laser light and interference with intensity observations in the CH-stretching region. Phospholipids studied range from dimyristoylphosphotidyl choline (C₁₄, transition T = 24°C) to dibehenoylphosphotidyl choline (C₂₂, transition T = 74°C).